

investigations, and it is not only of great importance from a purely entomological point of view, inasmuch as the rearing of galls yields insects which belong to the parasites and inquilines, which could not probably be obtained in any other way, but it is so also because it binds together inseparably two great

fields of human investigation. botany and entomology. But the study of plant-galls has moreover a deep practical interest in two other directions, in an industrial and agricultural regard. An all-sided consideration of the subject should not leave these sides of it unattended to.

ON THE RELATIONS OF FUNGI TO GALLS AND TO LARVAE OF CECIDOMYIA LIVING IN GALLS.

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[Reprint, with slight amendment, of an abstract with the same title, by Hermann August Hagen (Canadian entom., July 1885, v. 17, p. 136-137), of a review, by Friedrich August Wilhelm Thomas (Armischia, 1885, v. 5, p. 4-), based on a record by Fritz Ludwig (Botan. centralblatt, v. 20, p. 356-) of W. Trelease's "Notes on the relations of two cecidomyians to fungi" (Psyche, Aug.-Sep. 1884, v. 4, p. 195-200), Trelease's paper not having been seen by Thomas.]

Larvae of *Cecidomyia* living in the spore-layers of *uredineae* are also found in Thuringia, Germany. In fact the discovery of the community in the same layer of two otherwise very different parasites is at first somewhat wonderful and startling. The right explanation will be a double symbiosis of a phanerogamous plant and a fungus, and of a fungus and an entomozoon. Years ago I received from Gotha such larvae out of the rust-fungus of *Rosa*. A similar manner of living is known in Germany for *Diplosis contophaga* Winnertz and for *D. caematis* Winn. Their larvae were found by F. Loew in the rust-fungus of several plants (cf. Verh. Zool.-bot. ges. Wien, 1874, p. 155-). I am able to add two new facts. I found larvae of *Cecidomyia* on *Vaccinium uliginosum* in the spore-layers of *Thecospora myrtillina* Karsten (*Melampsora vaccinii* Alb. et Schn.), on the Beerberg in the Thueringerwald. The other one was sent to me by Dr. E. Levier, from Florence,

Italy. The leaves of *Tanacetum balsamita* L. (Erba di Santa Maria) had, in the *Puccinia tanacetii balsamitae* D C., many small red larvae of *Cecidomyia*. I am not of opinion that this guard is of prominent advantage for the plant. The enormous numbers of the spores of the rust-fungus will scarcely be diminished by these larvae to any extent, that the guard may be considered to be a practical advantage for the plant.

The second point of interest in Mr. Trelease's paper is that the larvae open the way for the fungus in the plants. I may state as an analogous fact, that here the pustulae and pocks on the leaves of *pomaceae*, made by *Phytoptus*, are not rarely filled by fungi, especially by the carbonized ones. The last plant I received by the late Alex. Braun, in 1877, from Blankenburg, Harz, was a leaf of *Sorbus aucuparia*, with fungus immigrated in the galls of the mites.